

NEW AND OTHERWISE INTERESTING TERTIARY MOLLUSCA
FROM TEXAS.

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While employed as Tertiary paleontologist to the Geological Survey of Texas during the years 1892 and 1893, the writer prepared a large monograph on the Tertiary mollusca of the State with the intention of publishing it in the 5th Annual Report of that Survey. For want of funds the printing of this report has been indefinitely postponed, and accordingly the following facts and descriptions of new species, taken from the monograph in question, have here found an appropriate place for publication.

The points in stratigraphy brought out by the study of the various Tertiary faunas of the State have been included with other matter in an article published by the State Geologist in the Journal of Geology, 1894, p. 549.

Suffice it to say here that the Midway stage, so well developed in Georgia and Alabama and known also in Mississippi and Arkansas, exists also in Texas, as is proved by the occurrence of such species as *Enclimatoceras ulrichi*, *Ostrea pulaskensis*, *Cucullæa macrodonta*, *Volutilithes limopsis* and others.

The Lignitic stage, so far as has been observed, is destitute of molluscan remains. The exposure on Brazos River, known as "Smiley's Bluff," two miles above the mouth of Pond Creek, is evidently about synchronous with the Matthews Landing beds of Alabama. These are now included in the Midway stage.

The Lower Claiborne beds are replete with fossils, many of which are common to this horizon in Louisiana, Mississippi, Alabama, and South Carolina. Besides these well-known forms there are many new ones, some of which are described below.

The true Claiborne, the Jackson, and the Vicksburg stages seem to have no representatives in Texas. This fact cannot be too strongly emphasized since most writers on Texas géology have referred certain fossil bearing outcrops to some of these upper Eocene stages.

PELECYPODA.

Genus MODIOLA.

Modiola houstonia sp. nov. Pl. 1, fig. 1.

Specific characterization.—General form of shell as figured; thin, showing concentric lines of growth on the area below the umbonal ridge; above the same, with broad concentric undulations, becoming more numerous towards the umbones; anterior, radially striate.

Localities.—Three miles northeast of Crockett, Houston Co., Tex.; also five miles northwest of Orangeburg, S. C.

Geological horizon.—Lower Claiborne Eocene.

Type.—In Texas State Museum.

Modiola texana Gabb. Pl. 1, fig. 2.

Perna texana Gabb, Proc. Ac. Nat. Sci. Phila., 1861, p. 371.

The collections of the Survey have yielded few and imperfect specimens of this species.

Localities.—Caddo Peak, Texas, Gabb. Two miles southwest of Campbellton, Atascosa Co.; two miles east of Arnold's ranch, Frio Co., Tex. Near Red Land, La.

Geological horizon.—Lower Claiborne Eocene.

Specimen figured: From near Red Land, La., property of U. S. Nat. Museum.

Type.—In the Academy of Natural Sciences of Philadelphia.

Genus LEDA.

Leda bastropensis nov. sp. Pl. 1, fig. 3.

Specific characterization.—General form as figured; medial portions of the valves with regular, strong, concentric striae; striae obsolete on the anterior end and on the post-umbonal slope, the latter with a shallow furrow extending from the umbo to near the extremity of the valve; within the valve, a raised line or ridge, emanating from the umbonal region and extending along beneath the hinge finally terminates in the middle of the posterior end and is there slightly enlarged.

This species differs from *L. plicata* Lea in its lack of striation over portions of the exterior, and the more central positions of the umbones. From *L. mater* Mr., *bastropensis* is distinguished by its want of anterior radiating sulci, its lack of post-umbonal striation, and by its form. This is readily distinguished from *L. albirupina*

Har. since it lacks the smooth Yoldia-like aspect about the umbones so characteristic of that species.

Localities.—Rio Grande at Starr-Zapata Co. line; Brazos River, one mile below Milam-Burleson Co. line, Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—In Texas State Museum.

Leda milamensis nov. sp. Pl. 1, fig. 4.

Specific characterization.—General form as figured; surface covered with fine concentric striæ except near the anterior margin where it is smooth and polished; diameter from beak to base great and the shell here much inflated; posterior remarkably narrow and flattened.

Locality.—Smiley's Bluff, Brazos River, two miles above the mouth of Pond Creek.

Geological horizon.—Midway Eocene.

Type specimen.—In Texas State Museum.

Leda houstonia nov. sp. Pl. 1, fig. 5.

Specific characterization.—General form as figured; concentric lines scarcely discernible except where they pass over the umbonal ridge; post-umbonal area traversed by one raised line extending from the umbo to near the extremity of the valve; sometimes as many as eight or ten raised radiating lines appear near the posterior sub-margin.

Localities.—Between Orrell's and Evergreen Crossing, Elm Cr., Lee Co.; Alabama Bluff, Trinity River, Houston Co.; along Elm Cr. from Orrell's to Price's Crossing, Texas.

Specimens of this species occur in the collection of the Academy of Natural Sciences of Phila., labelled "*Leda (Nuculana) subtrigona* Con.?, S. Carolina."

Geological horizon.—Lower Claiborne Eocene.

Type.—In Texas State Museum.

Subgenus **ADRANA.**

Adrana aldrichiana nov. sp. Pl. 1, fig. 6.

Specific characterization.—Size and general form as indicated by the figure; exterior smooth and polished; within smooth; sinus small; posterior row of teeth much the longer.

The type specimen is compressed vertically, the umbo should be somewhat more elevated than is represented by the figure. The type and all the specimens seen by the writer were in the collection of T. H. Aldrich, temporarily loaned to the survey.

Geological horizon.—Lower Claiborne Eocene.

Locality.—Brazos River, Tex., one and one-half miles below Mosley's Ferry.

Genus **VENERICARDIA.**

Venericardia trapaquara nov. sp. Pl. 1, fig. 7.

Specific characterization.—General form as figured; ribs about twenty-four, compound, *i. e.*, broad at base, surmounted by a medial dentate carina; umbonal ridge prominent.

This species is remarkable for its quadrangular form and the prominence of its umbonal ridge. It belongs to the *alticostata* stock and is most nearly allied to *Cardita subquadrata* Con. (Jr. Ac. Nat. Sci. Phila., 2d Ser., 1848, p. 128, pl. 14, fig. 10), but from Conrad's description and figure it is evident that his species is much more compressed, the umbonal ridge less prominent, and the beaks more nearly central.

Locality.—Cedar Creek, southeast corner of Wheelock League, 200 yds. north of Brazos Co. line, Robertson Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **ASTARTE.**

Astarte smithvillensis nov. sp. Pl. 1, figs. 8, a; 9, a, b, c.

A. conradi Buckley, 1st Ann. Rep. Geol. Agr. Surv. Tex., 1874, p. 63.

Crassatella alta (young) Heilp., Cont. to Geol., 1884, p. 38.

Astarte tellinoides Heilp., Proc. Ac. Nat. Sci. Phila., 1890, p. 402.

Specific characterization.—Size and general form as indicated by the figures; surface in typical specimens marked by strong concentric rugæ especially towards the base; these slope gently above but abruptly below and are superimposed by fine striæ; umbones flattened.

This species shows great variations in form and size as well as markings. At Collier's Ferry some specimens are more elongated, others more rotund; some have crenulations on the interior submargin while others are smooth. Several of these forms are shown by the figures cited.

Localities of the typical form.—Devil's Eye, Colorado River, Bastrop Co.; Smithville, Bastrop Co., Tex.

Locality of the smaller forms.—15 miles southeast of Nacogdoches, Nacogdoches Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Types.—Texas State Museum.

Genus **CRASSATELLA.**

Crassatella texalta nov. sp. Pl. 2, fig. 2.

Specific characterization.—General form as figured; exterior smooth about the umbones, but marked by lines of growth anteriorly and sub-basally; hinge and marginal crenulations as in *C. alta* Con.

This species is closely allied to *C. alta*, but is distinguished by its proportionally longer form and its smooth umbones, the latter feature being in marked contrast with the corrugations of *C. alta*. It evidently does not attain the large dimensions of Courad's species.

Localities.—Alabama Bluff, Trinity River, Houston Co.; Hurricane Bayou, Houston Co., Tex.; 2½ miles east of Newton, and 4 miles west of Enterprise, Miss.

Geological horizon.—Lower Claiborne Eocene.

Type specimen.—Texas State Museum.

Crassatella trapaquara nov. sp. Pl. 2, fig. 3, a.

Specific characterization.—General form as figured; surface concentricly striate anteriorly, smooth posteriorly, except a few shallow concentric depressions marking periods of growth; hinge teeth not so strong as in *texalta*; lunular margin concave; basal margin of the valves but slightly convex, crenulated within anteriorly and basally but not posteriorly.

Localities.—Smithville, Bastrop Co.; 8 miles east of Alto, Cherokee Co.; Elm Creek, between Orrell's and Evergreen Crossing, Lee Co.; Murchison's Headright, northern boundary, Houston Co.; R. Williams' Headright, northeast of Weches, Houston Co., Tex. Also Moore's Iron Mine, La., and near Enterprise, Miss.

Geological horizon.—Lower Claiborne Eocene.

Type.—Harris' collection.

Crassatella antestriata Gabb. Pl. 1, fig. 10, a.

C. antestriata Gabb, Journ. Ac. Nat. Sci. Phila., vol. iv, 1860, p. 388, pl. 67, f. 53.

Gabb's figure and description were of a young specimen; the figure herewith given is of an adult. Compared with *trapaquara*, *antestriata* is much more oblique, or inequilateral, the posterior extremity is sub-biangular and crenate within, and the basal margin is more convex. Externally *antestriata* is more strongly marked.

Localities.—Lee Co.; Elm Creek, between Evergreen and Orrell's Crossing, Lee Co.; Alabama Bluff, Trinity River, Houston Co.;

5 miles west of Crockett, Houston Co.; Hurricane Bayou, Marster's and Hodge's Survey, Houston Co.; Baptizing Creek, Cherokee Co.

Geological horizon.—Lower Claiborne Eocene.

Type.—Singley's collection, from Lee Co.

Crassatella texana Heilp. Pl. 2, fig. 1.

C. texana Heilp., Proc. Ac. Nat. Sci. Phila., 1890, p. 406, pl. xi, f. 6.

This is certainly very distinct from *antestriata*. Besides the points of difference mentioned by Heilprin the following may be noted: The umbonal ridge is much sharper in *texana*, and there is a trace of a sinus just below it; the posterior margin is not sub-biangular as in *antestriata*, and the valves are less oblique.

From *trapaquara* this species can be distinguished by its surface markings, lower form, and the depression just below its umbonal ridge.

Localities.—Near McBee's School-house, 2 miles east of Alto; Berryman's Land, Kimble Headright, Cherokee Co.; Murchison's Headright; Lively's Place, Wilson Headright, Houston Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Apparently lost.

Genus SPHÆRELLA.

Sphærella (?) *anteproducta* nov. sp. Pl. 2, fig. 4.

Specific characterization.—Size and general form as indicated by the figure; anterior somewhat produced, laterally compressed; posterior dorsal margin likewise somewhat compressed; ventricose.

This species is much more ventricose than *inflata* Lea, from Claiborne, and scarcely as much so as *turgida* Con., from the Vicksburg beds. The umbones are intermediate in size between *inflata* and *turgidula*, the size greater than either.

Localities.—Cedar Creek, Wheelock League, Robertson Co.; cutting on Tyler and South Eastern R. R., 400 yards south of mile post No. 23, Cherokee Co.; Dr. Collard's Farm, Sparks Headright, Brazos Co.; Elm Creek, Lee Co., Tex. Also from mouth of Saline Bayou, Red River, Louisiana.

Geological horizon.—Lower Claiborne Eocene.

Type.—Singley's collection.

Genus MERETRIX.

Meretrix texacola nov. sp. Pl. 2, fig. 5, a, b.

Specific characterization.—Size and general forms as indicated by the figures; surface generally smooth about the umbones, but often

more or less corrugated concentrically towards the base, especially posteriorly; lunule in the larger specimens, very indistinct in the smaller forms bordered by a well incised line.

The surface markings resemble somewhat those of *C. nuttalliopsis* Heilp., but the anterior and posterior are too pointed, the shell in general too inflated, and the umbonal angle too great for that species. The larger specimens resemble *M. californica* Con.

Localities.—Rio Grande at Webb-Zapata County line; Smithville, Bastrop Co., 2 miles east of Alto, Cherokee Co.; Mosley's Ferry, Brazos Co.; Cedar Creek, Robinson Co.; Alum Bluff, Trinity River; Hurricane Bayou, Houston Co.; Collier's Ferry, Brazos River, Burleson Co.; cutting on Houston East & West Texas R. R., 4 miles north of Corrigan, Polk Co., Texas. Also from the base of the bluff at Claiborne, Ala.

Geological horizon.—Lower Claiborne Eocene.

Types.—Texas State Museum.

Genus TELLINA.

Tellina tallicheti nov. sp. Pl. 3, fig. 1.

Specific characterization.—Size and general form as indicated by the figure; not-twisted posteriorly; thin; posterior sub-biangulate; anterior rounded; beak slightly behind the center; lateral teeth well developed; posterior cardinal bifid; pallial sinus and muscular scars of good dimensions though rather dimly marked; exterior smooth, except a few concentric striæ on the post-umbonal slope; umbonal ridge passes from the beak to the postero-basal margin.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Harris' collection.

Genus SILIQUA.

Siliqua simondsi nov. sp. Pl. 3, fig. 2.

Specific characterization.—Size and general form as indicated by the figure; anterior acutely rounded sub-basally, posterior rounded; from the umbo radiate two depressions (in the cast), the anterior deep, the posterior more nearly vertical and faint; pallial line and sinus comparatively well marked.

Locality.—Dr. Williams' quarry, Stephenson's Headright, Brazos Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CERONIA.

Ceronia singleyi nov. sp. Pl. 3, fig. 3, a.

Specific characterization.—General form as figured; beaks prominent, turned anteriorly; anterior side often very elongate; posterior generally short, obtusely pointed, with an obtuse angle midway of the posterior dorsal margin; umbonal ridge rounded; post-umbonal slope of considerable width and nearly at right angles to the face of the valve; substance of the valve moderately thick.

The young of this species have a decidedly *Schizodesma* appearance. Older specimens assume the general form of *Hemimactra elongata* of the Indo-Pacific region.

This species is known only in the form of casts in a light gray sandstone. It is regarded as a Mactroid shell, and not a *Macoma*, because (a) the beaks point anteriorly; (b) there is no indication of a twisting posteriorly; (c) the hinge margin of this shell is thick and evidently bore well-developed lateral teeth; (d) the posterior is very obtuse.

Locality.—Sunnyside Church, Lee Co., Texas.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus PERIPLOMA.

Periploma collardi nov. sp. Pl. 3, fig. 4.

Specific characterization.—General form as figured; nearly equi-valve; beaks turned slightly backward; posterior deflected to the right; substance of the shell thin and very nacreous; umbones fissured.

The general form of this species is somewhat like that of *Ceronia singleyi*, from which, however, it is distinguished by the difference in direction of the beaks, as well as by the beaks themselves. Again this species has a much more extended posterior dorsal margin.

Localities.—Dr. Collard's farm, Sparks' Headright, Brazos Co., Tex. Also mouth of Saline Bayou, Winn Parish, La., and base of bluff at Claiborne, Ala.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CORBULA.

Corbula aldrici Meyer, var. *smithvillensis* nov. var. Pl. 3, fig. 5, a.

The variety is larger than the typical form, beak in the left valve more nearly central; right valve proportionally higher; radiating lines generally obsolete.

Localities.—Smithville, Bastrop Co.; Burleson Shell Bluff on Brazos River; 2 miles east of Alto, Cherokee Co.; Mosley's Ferry, Brazos River; Cedar Creek, Wheelock League, Robertson Co.; Elm Creek, Robertson Co.; Berryman's Land, Cherokee Co.; Alum Bluff, Trinity River, Houston Co.; 2 miles south of Mt. Selmon P. O., Cherokee Co.; 1 mile south from Nevilles, Gonzales Co.; 15 miles southeast of Nacogdoches, Nacogdoches Co., Tex. Also near Enterprise, Miss.

Geological horizon of the variety.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **MARTESIA.**

Martesia texana nov. sp. Pl. 3, fig 6.

Specific characterization.—General form as figured; surface marked by concentric lines or corrugations crossed by a radiating fold; anterior to this the lines are strong, but behind it they are very faint.

This species differs from *M. elongata* Ald., by its much greater anterior development, and hence the much more central position of the radiating fold.

Locality.—Two miles east of Alto, Cherokee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type specimen.—Texas State Museum.

GASTROPODA.

Genus **RINGICULA.**

Ringicula trapaquara nov. sp. Pl. 3, fig. 7.

Specific characterization.—Whorls 5; whorls 1, 2, and 3 nearly or quite smooth; 4 with a well marked subsutural line and fainter ones over the whole surface; body whorl strongly striate spirally, labrum very much thickened and crenulate within, labial callosity very pronounced, the two labial plicæ strong and ascending rapidly upon the body whorl.

This species differs from *R. biplicata* Lea by its more numerous spiral striæ, its greater oral callosities, and the obliquity and strength of the columellar plicæ. *R. mississippiensis* Con. has plications somewhat similar to those of this species, but in other respects it is nearly like *R. biplicata*.

Localities.—San Antonio Ferry, Brazos River, Burleson Co.; between Orrell's and Evergreen Crossing, Elm Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **VOLVULA**.

Volvula? smithvillensis nov. sp. Pl. 3, fig. 8.

Specific characterization.—Shell large anteriorly and centrally but attenuated posteriorly; thick; spirally striate near either terminus; columella with one strong fold.

This shell has somewhat the form of *Acteonella*. It differs from *V. minutissima* by its greater thickness, its greatest diameter being located more to the anterior, and by its thick, strong columellar fold.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **CYLICHNELLA**.

Cylichnella atysopsis nov. sp. Pl. 3, fig. 9, a.

"*Volvula minutissima*" Gabb, specimen in coll. Ac. Nat. Sci. Phila.

Specific characterization.—General form globose as figured; substance of the shell rather thick; spirally striate; columella with one fold; umbilicated.

Locality.—Little Brazos River, near iron bridge, on Mosley's Ferry road.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum. Fig. 9a is the so-labelled *V. minutissima* of the Academy collection.

Genus **TEREBRA**.

Terebra texagyra nov. sp. Pl. 3, fig. 10.

T. polygyra Heilp., Proc. Ac. Nat. Sci. Phila., 1890, p. 398.

Specific characterization.—General form and size as indicated by the figure; whorls about 15; marked as follows: slightly shouldered below the suture; below, two-sevenths of the way to the next suture with a moderately strong spiral stria; ribs about 15 on each whorl, strong above but dying out below, not deflected or dislocated by the subsutural revolving line; columella twisted as shown in the figure.

Conrad's *T. polygyra* has a more slender form, with far less prominent plicæ. *T. divisurum* and *T. polygyra* both show dislocation at the subsutural line. *T. texagyra* resembles *T. tantula* in some respects, but is less costate and less slender.

Localities.—Between Orrell's and Evergreen Crossing, on Elm Creek, Lee Co.; near Crockett and 2 miles west of Crockett, Houston Co.

This is doubtless, in part at least, the species referred to by

Aldrich and Meyer as "*T. divisura* Con., var." They give as localities, Claiborne and Lisbon, Ala.; Wautubbee and Newton, Miss.; Wheelock, Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Terebra houstonia nov. sp. Pl. 3, fig. 11, and Pl. 4, fig. 1.

T. polygyra Heilp. (*non* Con.), Coll. U. S. Nat. Mus.

T. vetusta Heilp. (*non* Lea), Proc. Ac. Nat. Sci. Phila., 1890, p. 398.

? *T. vetusta* Gregorio, Mon. Faun. Eoc. de l'Ala., pl. 1, figs. 40, 41.

Specific characterization.—Size and general form as indicated in the figure; whorls 12 or 13, longitudinally ribbed, the ribbing being much coarser in the upper part of the shell than in the lower; suture margined below by an obscurely impressed revolving line; columella straight, smooth, tapering rapidly.

This species is characterized at once by the height of its whorls in comparison to their respective diameters, the bulging sides of the whorls, the irregularities of the ribbing, and the straight, smooth columella.

Localities.—Smithville, Bastrop Co.; near McBee's school-house, Cherokee Co.; Little Brazos River, near iron bridge, on Mosley's Ferry road; Cedar Creek, Wheelock League, Robertson Co.; Elm Creek, Lee Co.; near Crockett and 2 miles west of Crockett, Houston Co.; Collard's farm, Sparks' Headright, Brazos Co.; Arnold's Ranch, Frio Co.; southeast of Campbellton, just south of Lipan Creek, Atascosa Co. Also in Claiborne, Webb, and Bienville Parishes, La.: 2 miles east of Newton, Miss.; Claiborne, Ala.: 2 miles west of Orangeburg, S. C.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CONUS.

Conus smithvillensis nov. sp. Pl. 4, fig. 2.

Specific characterization.—General form as figured; whorls about 12; smaller spiral whorls costate or crenulate; penultimate whorl smooth; body whorl smooth, except about 12 revolving lines at base.

This species bears much resemblance to the figure given in Proc. Ac. Nat. Sci. Phila., 1879, pl. 13, fig. 8, of "*Conus pulcherrimus* Heilp., but upon examining the type of this species now in the Amer. Mus. Nat. Hist., N. Y. City, it was found to be, as already

stated by Meyer, a Pleurotomoid shell. *C. parvus* of H. C. Lea is evidently the young of *sauridens* Con.

Locality.—Smithville, Bastrop Co., Tex.

Type.—Texas State Museum.

Genus PLEUROTOMA.

Pleurotoma enstricrina nov. sp. Pl. 4, fig. 3.

Specific characterization.—General form and size as indicated by the figure; whorls 10; nuclear whorls 1, 2, 3, 4 smooth, 5 costate, whorls 6, 7, 8, 9 ornamented by (a) a crenulated narrow band below the suture, (b) a narrow concave space in which there are two or three fine but distinct spiral striæ, (c) a broad costate band, (d) a spiral line or two, body whorl marked below the costate band by coarse spiral lines and with more or less apparent lines of growth.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Figured Type.—Texas State Museum.

Pl. (*Pleurotomella*) *anacona* nov. sp. Pl. 4, fig. 4.

Specific characterization.—General form as figured; whorls 8; 1 nearly or quite smooth; 2, 3, 4, 5, 6 with (a) a broad slightly concave band showing very faint spiral striæ and a deep retral curve in the longitudinal striæ, (b) a slight basal carina with two or three strong spiral lines and rather faint, slightly oblique nodules; body whorl with more or less alternating coarse and fine spiral lines from the nodose carina to the end of the beak.

Localities.—Well at Elgin, northeast corner of Bastrop County; Smiley's Bluff, Brazos River, 2 miles above Pond Creek, and perhaps on Rocky Cedar Creek, 5 miles west of Elmo.

Geological horizon.—Midway Eocene.

Type.—Texas State Museum.

Pl. (*Surcula*) *gabbi* Con. Pl. 4, fig. 5.

Surcula gabbi Con., Am. Jour. Conch., vol. 1, 1865, p. 142, pl. 11, fig. 5.

Pleurotoma platyzona Heilp., Proc. U. S. Nat. Mus., 1880, p. 150, fig. 3.

Pleurotoma alveata Con., Coll. Ac. Nat. Sci. Phila.

In adult specimens there are 12 whorls; of the 5 nuclear, 1, 2, and 3 are smooth, while 4 and 5 are prominently costate. Heilprin's *platyzona* is an eroded specimen of this species.

This is one of the commonest fossils in the Texan Lower Claiborne Eocene and is specially abundant in Bastrop, Burleson, Lee and Houston Counties.

Figured specimen.—Texas State Museum.

Type.—Probably the specimen in the Academy's collection.

Pl. (*Surcula*) *moorei* Gabb. Pl. 4, fig. 6, a, b.

Turris moorei Gabb, Jour. Ac. Nat. Sci. Phila., vol. 4, 1860, p. 378, pl. 67, fig. 11 (not fig. 9 as stated in Gabb's text).

Pleurotoma tuomeyi Aldrich, Bull. Geol. Surv. Ala., No. 1, 1886, p. 31, pl. 3, fig. 11.

Pleurotoma tuomeyi Heilprin, Proc. Ac. Nat. Sci. Phila., 1890, p. 394.

Surcula moorei Heilp., Proc. Ac. Nat. Sci. Phila., 1890, p. 394.

This species shows considerable variation in form as indicated by figs. 6, 6a, 6b. The specimen in the collection of the Academy is of about the form and size of that represented by fig. 6, though it shows more prominent denticulations on the spire, approaching fig. 6b in this respect. Specimens of this species in the U. S. Nat. Mus. collection from Wood's Bluff, Ala., are slightly stouter in form, *i.e.*, have a shorter spire. This, however, is not always the case, for Aldrich's type from this locality is of nearly the normal form. The Alabama specimens all show denticulations on the upper spiral striæ, a feature apparently overlooked by Aldrich when describing his *Tuomeyi*.

Localities.—Smithville, Bastrop Co.; Little Brazos River, Cedar Creek, Wheelock League, Robertson Co.; Mosley's Ferry, Burleson Co.; Elm Creek, Lee Co.; Alabama Bluff, Trinity River, Houston Co., Texas. Also from Wood's Bluff, Ala.

Type.—Probably lost.

Geological horizon.—Lignitic, and Lower Claiborne Eocene.

Pleurotoma beadata nov. sp. Pl. 4, fig. 7.

Specific characterization.—General form as shown in the figure; whorls 9; 1, 2, 3 smooth, 4, 5 transversely costate, 6, 7, 8 obliquely costate, the costæ most pronounced not far below the suture and dying out below, evenly and coarsely striate spirally; suture bordered below by a raised crenulated line; body whorl either costate on its humeral portion or plain; evenly striate spirally; retral sinus shallow, canal long, straight.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pleurotoma vaughani nov. sp. Pl. 4, fig. 8.

Specific characterization.—Size and general form as indicated by the figure; whorls about 11; 1, 2, 3 smooth and very small, 4 nodular,

5 nodular and with a subsutural line or band; 6, 7, 8, as 5, but also striate spirally; 9, 10 nodular costate, costæ showing a slight tendency to become oblique, mainly confined to the lower moiety of the whorls, strongly striate below, and with two noticeably large striæ on the carina, faintly striate above; body whorl with rather coarse spiral lines alternating in size from the carinal region to the end of the beak, supercarinal region faintly striate, costæ obscure, labrum striate within.

Localities.—Smithville, Bastrop Co.; Hurricane Bayou, Marsters' Survey, Houston Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pleurotoma huppertzi nov. sp. Pl. 4, fig. 9.

Specific characterization.—Size and general form as indicated in the figure; whorls 11; 1, 2 smooth, 3–10 somewhat inflated submedially, longitudinal costæ obtuse, most prominent submedially, almost vanishing on the subsutural portions of the whorls, becoming short and nodular on the upper whorls, prominently striate spirally, the striæ often irregular and waving on the medial portions of the whorls; body whorl costate and spirally striate, striæ becoming of alternating strength on the beak.

Localities.—Bombshell Bluff, Colorado River, about 1½ miles west-northwest of Devil's Eye; Smithville, Bastrop Co., Tex.

A very closely allied form occurs at Wood's Bluff, Ala. The main difference consists in the different location of the retral sinus. In the Alabama specimens it is located on the humeral angle while in the Texan it is about one-third way from this angle to the suture.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Variety penrosei nov. var. Pl. 4, fig. 10.

Differs from typical *huppertzi* in having the whorls more acutely carinated, the striation above the carina is evanescent, and the length of the canal is often less in proportion to the height of the spire.

Localities.—Same as for *huppertzi*.

Geological horizon.—Lower Claiborne Eocene.

Type specimen.—Texas State Museum.

Pleurotoma leoncola nov. sp. Pl. 5, fig. 1.

Specific characterization.—General form and size as indicated by

the figure; whorls 9; apical $1\frac{1}{2}$ smooth, rather large, remaining whorls carinated centrally, and with evenly arranged rather low but distinct costæ, more prominent below the carina than above it, twelve in number on the body whorl; surface microscopically striate spirally, and with very fine lines of growth; aperture a little over one-half the whole length of the shell; columella long and slightly twisted below.

Locality.—7 miles south of Jewett, Leon Co.

Geological horizon.—Lower Claiborne Eocene.

Type.—Collection of T. H. Aldrich, Birmingham, Ala.

Pl. (*Drillia*) *dumblei* nov. sp. Pl. 5, fig. 2.

Specific characterization.—Size and general form as indicated in the figure; whorls about 10, strongly carinated, concave above, convex below, spiral striæ much more noticeable below the carina than above it; beak short, twisted, umbilicated.

Locality.—?Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pl. (*Drillia*) *dipta* nov. sp. Pl. 5, fig. 3.

Specific characterization.—Size and general form as shown in the figure; whorls 9; 1, 2 smooth, 3 longitudinally costate, 4–8 medially carinate, carina ornamented by oblique nodules, just below the suture there is a raised line or band; body whorl with less prominent carinal nodules, but with a few well-defined raised spiral lines; canal short, slightly curved.

Locality.—Baptizing Creek, Kimble Headright, Cherokee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pl. (*Drillia*) *nodocarinata* Gabb. Pl. 5, fig. 4.

Turris nodocarinata Gabb, Jour. Ac. Nat. Sci. Phila., vol. 4, 1860, p. 379, pl. 67, fig. 13.

Gabb's figure of this species is exceedingly poor and his types at the Philadelphia Academy are in a state of confusion. In one lot labelled "*Turris nodocarinata* Gabb, Eocene, Tex.," in Gabb's handwriting may be seen *P. nodocarinata*, young of *P. moorei*, *childreni* var., and *terebriformis*. On the card bearing the name *Turris nodocarinata* may be seen: *Pl. nodocarinata*, *childreni* var., and

terebriformis. All those labelled *Pl. nodocarinata* in Heilprin's Texan collection are *terebriformis*.

The specimen herewith figured is large and well developed, while Gabb's specimen was evidently small. The sutural crenulation disappears on the larger whorls. Fine revolving striæ are often seen on the zone between the suture and carina.

Localities.—Two miles above San José on the Rio Grande; Smithville, Bastrop Co.; Wheelock, Robertson Co.; Mosley's Ferry, Brazos River, Burleson Co.; Cedar Creek, southeast corner of Wheelock League, Robertson Co.; Elm Creek, Lee Co.; Alabama Bluff, Trinity River, Houston Co.; Hurricane Bayou, near Crockett, Houston Co.; 2 miles east of Alto, Cherokee Co.; 1 mile south of Nevilles, Gonzales Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Types.—? Academy of Natural Sciences of Philadelphia.

Pl. (*Drillia*) *prosseri* nov. sp. Pl. 5, fig. 5.

Specific characterization.—Size and general form as indicated by the figure; whorls about 8; 1, 2, and sometimes 3, smooth; 4, 5, 6, 7 polished, a slightly raised band just below the suture, costæ large, obtuse, and somewhat obliquely set; body whorl with sub-sutural band not well defined, humeral area slightly concave and gently waved by the upward extension of the ribs, which are very large below; beak slightly striate spirally.

Localities.—Near Smithville, Bastrop Co.; Little Brazos River, near iron bridge on Mosley's Ferry road; near Crockett, Houston County.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

This species is distinguished from *huppertzi*, *kellogi*, and varieties by its polished surface, its more pointed apex, the length and obliquity of the ribs, and its size.

Pl. (*Drillia*) *kellogi* Gabb. Pl. 5, fig. 6.

Turris kellogi Gabb, Jour. Ac. Nat. Sci. Phila., vol. 4, 1860, p. 379, pl. 67, fig. 10.

Surcula kellogi Con., Am. Jr. Conch., vol. 1, 1865, p. 18.

Surcula kellogi Heilp., Proc. Ac. Nat. Sci. Phila., 1890, p. 394.

The two type specimens in the Philadelphia Academy's collection differ but little from the specimen herewith figured. The only point worthy of note is that in those specimens the length of the aperture

is not quite so great in comparison with the whole length of the shell.

This species is characterized mainly by its slim spire, blunt apex, and raised line at the suture.

Localities.—Hurricane Bayou, Marsters' Surv., near Crockett, Houston Co., and, according to Gabb, "Wheelock, Tex."

Geological horizon.—Lower Claiborne Eocene.

Type.—Academy of Natural Sciences of Philadelphia.

Pl. (*Drillia*) *texacona*, *nom. mut.* Pl. 5, fig. 7.

Drillia texana Con. *non* Gabb, Amer. Jr. Conch., vol. 1, 1865, p. 143.

Localities.—Little Brazos River, near iron bridge on Mosley's Ferry road; Cedar Creek, Wheelock League, Robertson Co.; Jones' farm, Hurricane Bayou, Houston Co.; Elm Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Probably the specimens in the Academy of Natural Sciences of Philadelphia.

Pl. (*Drillia*) *texanopsis* *nov. sp.* Pl. 5, fig. 8.

Specific characterization.—Form in general as figured, though the specimen drawn was young; whorls about 12; 1–5 smooth, tapering to a sharp point; other spiral whorls scarcely distinguishable from those of *texacona*, body whorl with faint revolving striae, becoming stronger below; beak long, straight.

On the last or body whorl the costae often become obsolete and a more or less distinct carina is developed; above which, or between which and the suture, the shoulder is slightly concave.

Localities.—Smithville, Bastrop Co.; Bombshell Bluff, Colorado River, Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pleurotoma insignifica Heilp. Pl. 5, fig. 9.

Fusus nanus Lea, Cont. to Geol., 1833, p. 150, pl. 5, fig. 155.

Pleurotoma insignifica Heilp., Proc. Ac. Nat. Sci. Phila., 1879, p. 213, pl. 13, fig. 9.

Pleurotoma nana Meyer, Bericht über die Senckenbergische Naturforschende Gesellschaft in Frankfurt, a. M. Sonder-Ausdruck, 1887, p. 18.

Fusus (Livofusus) nanus De Greg., Mon. Faun. Eoc. Ala., p. 87.

This species shows considerable variation at Claiborne. As a rule the larger specimens are not so strongly carinated as the specimen herewith illustrated. The type specimen of *Fusus nanus* at the Philadelphia Academy has been compared with the Texan form and

there seems to be no reason for doubting their identity. Meyer was right in referring this species to *Pleurotoma*, and *Pl. nana* would stand were it not for the fact that Deshayes in 1824 (Desc. Coq. Foss. des Env. de Paris, p. 482, vol. 2, pl. 68, figs. 19, 20, 21, 22) used the same name for a Paris Basin shell. Cossman has referred Deshayes' shell to the genus *Homotoma* (Bellardi, 1875) and has also referred other specimens to this genus which in general resemble Lea's and Heilprin's figures of *nana* Lea, and *insignifica* Heilp. At any rate the generic affinities of *nana* Lea, and *nana* Deshayes are too close to allow the retention of Lea's name; accordingly Heilprin's name, *insignifica*, must be adopted.

Lea's and Heilprin's characterization of this form being very imperfect, the following is offered:—

Size and general form as shown by the figure; whorls 8–10; 1, 2, 3 smooth, 4–8 with (a) a subsutural line, (b) a broad, faintly marked concave zone, (c) a strong carinal stria and just above it sometimes a faint line, (d) a strong subcarinal revolving line; body whorl with the subsutural line or band; the concave zone marked by curving longitudinal striæ and faint spirals; carinal angle 110° ; subcarinal space with about twenty-five revolving lines somewhat alternating in size; labrum within sometimes with one or two blunt, tooth-like elevations located back some distance from the margin.

Localities.—Smithville, Bastrop Co.: Little Brazos River, near iron bridge, on Mosley's Ferry road. Also Claiborne, Ala.

Geological horizon.—Lower and Upper Claiborne Eocene.

Type.—Of *nana* at the Philadelphia Academy, of *insignifica* at Mus. Nat. Hist. N. Y.

Pl. (Mangilia) infans Mr. Pl. 5, fig. 10.

?*Scobinella læviplicata* Gabb, Jr. Ac. Nat. Sci. Phila., vol. 4, 1860, p. 380, pl. 67, fig. 20.

Scobinella læviplicata Ald., MS., pl. 1, fig. 11.

Pleurotoma infans Meyer, Bull. Geol. Surv. Ala., No. 1, 1866, pl. 2, fig. 9.

Meyer's specimens were evidently all young or imperfect, for in the well-grown examples from Texas there are four adult whorls. Moreover they show two large tooth-like projections on the inside of the labrum, and not unfrequently two small plaits on the columella. On the smooth sinus zone there is sometimes a fine spiral line, occasionally there are two.

Localities.—Meyer gives for localities Red Bluff, Newton, and Vicksburg, Miss. In the collection of the U. S. Nat. Mus. it occurs

from Calhoun Co., Fla. In Texas: Smithville, Bastrop Co.; College Sta., Brazos Co.; 2 miles west of Crockett, and on Jones' farm, Hurricane Bayou, Houston Co.; Collard's farm, Town Branch, Brazos Co.

Geological horizon.—Lower Claiborne Eocene, Vicksburg Eocene, Lower Miocene.

Type.—Aldrich's collection.

Pl. (*Borsonia*) *penta* nov. sp. (by Ald. and Har.). Pl. 5, fig. 11, a.

Specific characterization.—General form as indicated by the figure; whorls 13 or 14; 1, 2, 3 smooth, globose; 4 slightly nodular or subcostate submedially and with an elevation just below the suture; 5, 6, 7 subcarinate with nodules on the carinae; 8, 9, 10, 11 carinate submedially, carina bisected by a depressed spiral line; space between the carina and suture above concave, traversed by about six spiral striæ of equal size, with a slightly elevated band just below the suture; 12 and 13 obtusely carinate with about six fine lines above and four below; body whorl finely striated above the carina and for a short distance below, thence coarsely or alternately striate to the end of the canal; outer lip sharp, liræ within exclusively confined to the inflated portion of the shell and disappearing some distance before reaching the margin of the lip; inner lip very thin showing only on well-preserved specimens; columella with one strong plait located three-fourths of the way from the base to the upper terminus of the aperture.

In a few specimens there are traces of a second plait on the columella a short distance below the one referred to above.

Localities.—Smithville, Bastrop Co. (rare); Wheelock, Robertson Co.; Mosley's Ferry, Brazos River, Burleson Co.; Cedar Creek, Wheelock League, Robertson Co.; College Sta., Brazos Co.; Campbell Creek, Robertson Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pl. (*Eucheilodon*) *reticulatoides* nov. sp. Pl. 5, fig. 12.

Specific characterization.—Size and general form as indicated by the figure; whorls about 10; 1, 2, 3 smooth, tapering rapidly to a point; 4 more or less costate; remaining whorls ornamented as follows: just below the suture, a raised line or band, below which a sunken zone is marked in the larger whorls by from one to three

spiral incised lines crossed obliquely by lines of growth giving this portion of the whorl a cancellated appearance; on the body whorl, below the three or four cancellated strong medial spiral lines, there are from 15 to 18 more or less crenulated spiral lines, tending in some instances to alternate in size; labrum within with strong lirations; columella rather long, straight, and with one strong plait located above the middle, below which there are generally several minor folds, decreasing in size downward.

In many of its features this species is intermediate between the young of *Borsonia penta* as here figured and *Eucheilodon reticulata*.

Locality.—Mosley's Ferry, Brazos River, Tex.

Type.—Texas State Museum.

Pl. (*Taranis*) *finexa* nov. sp. Pl. 5, fig. 13.

Specific characterization.—Size and general form as indicated by the figure; whorls 6; 2 nuclear, smooth; remaining whorls with (a) a subsutural raised ridge, (b) a strong medial carina, (c) a prominent raised line between the carina and the suture below, (d) fine costæ passing perpendicularly on the lower half of the whorl and obliquely to the left from the carina to the suture above; body whorl bicarinate, between the two carinæ, a strong raised line, below the carina about six raised spiral lines; columella slightly concave; labrum within showing channels and ridges corresponding to the exterior marking.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pl. (*Clathurella*?) *fannæ* nov. sp. Pl. 5, fig. 14.

Specific characterization.—Size and general form as indicated by the figure; whorls 7; 1-3 smooth, 4 finely and obliquely costate, remaining whorls cancellated by narrow costæ and 1 super-humeral and 4 sub-humeral raised liræ; columella long, straight, and smooth.

Locality.—Collier's Ferry, Brazos River, Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Pl. (*Bela*) *rebeccæ* nov. sp. Pl. 5, fig. 15.

Specific characterization.—Size and general form as shown by the figure; whorls 7; 1 and 2 small, smooth, 3 finely costate longitudinally; remaining whorls with (a) a sub-sutural raised line, (b) one

or two humeral lines, (c) one prominent line on the humeral angle, (d) many alternating lines below, (e) numerous costæ (15 on the body whorl), most prominent on the humeral angle.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **CANCELLARIA.**

Cancellaria panones nov. sp. Pl. 6, fig. 1.

Specific characterization.—Size and general form as shown in the figure; whorls 5; 1 and 2 smooth; 3 and 4 with sharp Scala-like costæ, shoulder narrow, slightly convex; body whorl shouldered as 3 and 4, with about fifteen smooth sharp costæ, spirally striate below; mouth ovate triangular, with about ten labrum crenulæ and three columellar folds; umbilicus not very large.

In this species the ribs are often somewhat irregular. On the spiral whorls two or three ribs are considerably larger than the others. The costæ just behind the aperture are generally of small size or evanescent.

Localities.—Smithville, Bastrop Co.; 2 miles east of Alto, Cherokee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

C. panones, var. *smithvillensis* nov. var. Pl. 6, fig. 2.

Differs from the typical form in having spiral striæ; about four on the lower spiral whorls and fourteen on the body whorl. The mouth is slightly larger in proportion to the length of the shell.

Localities.—Smithville, Bastrop Co.; Little Brazos River, near iron bridge on Mosley's Ferry road; Orrell's crossing, Elm Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

C. panones, var. *junipera* nov. var. Pl. 6, fig. 3.

In this variety the spiral striæ are quite numerous, the mouth is small in comparison with the length of the shell, and there are but two prominent columellar folds.

Localities.—Smithville, Bastrop Co.; Bluff on Colorado River, just below the mouth of Alum Creek, not far above Smithville;

Cedar Creek, southeast corner of Wheelock League, Robertson Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Cancellaria penrosei nov. sp. Pl. 6, fig. 4.

Specific characterization.—Size and general form as indicated by the figure; whorls 5; 1, 2, 2½ smooth; 3, 4 cancellated by about 18 sharp ribs over which pass 5 spiral lines, the uppermost on the humeral angle and some little distance above the others; body whorl with about eighteen costæ and twelve revolving lines, the uppermost of which, on the humeral angle is separated from the next below by a double space; aperture with two columellar folds and about six labral crenulæ; umbilicus moderate. Surface not polished as in the two above-described species.

Localities.—Smithville, Bastrop Co.; Dr. Williams' quarry, R. Stephenson's Headright, Brazos Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Cancellaria bastropensis nov. sp. Pl. 6, fig. 5.

Specific characterization.—Size and general form as shown in the figure; whorls 7; nuclear whorls 2½, of which two are smooth, and the last half finely cancellated; 4, 5, 6 somewhat irregularly costate, about ten costæ on the penultimate whorl; spiral striæ few and strong on the sides of the whorls, but becoming more closely set and finer on the subsutural region; body whorl with irregular, obtuse costæ crossed by about fourteen spiral lines, strong medially but decreasing in size towards the suture; labral dentes six on a raised ridge; columella with two distinct folds and a rudimentary third below; umbilicus rudimentary.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Cancellaria ulmula nov. sp. Pl. 6, fig. 6.

Specific characteristics.—Size and general form as indicated by the figure; whorls 4; 1, 2 smooth; 3 with seven spiral striæ; body whorl with about eighteen strong revolving lines and an equal number of intercalated fine striæ, lines of growth prominent; columella with

two prominent folds on its central portion and a third, rudimentary one below; umbilicus small.

Locality.—Elm Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Cancellaria ellapsa Con., Amer. Jour. Conch., vol. 1, 1865, p. 212, pl. 21 (not 20), fig. 8.

This Conrad describes as an Eocene species from Texas, but it proves upon examination to be nothing but "*Trichotropis cancellaria* Con.," a species described by Conrad from the Ripley Cretaceous beds of Mississippi. The Texas specimen was probably derived from the upper Cretaceous not far below Austin.

Genus VOLVARIA.

Volvaria gabbiana nov. sp. Pl. 6, fig. 7.

Marginella (*Volvaria*) *gabbiana* Ald., MS., pl. 2, fig. 13.

Specific characterization.—Size and general form as shown by the figure; whorls 3; 1, smooth; 2, spirally striate; body whorl long cylindrical, spirally striate with faint punctations in the striæ; labrum sharp-edged; labium with four basal folds varying in size as follows: at base a moderate sized fold, above, a stronger one, still above, a moderate sized one, and above all, a very faint one.

Localities.—Devil's Eye, Colorado River, Bastrop Co.; bluff just below the mouth of Alum Creek, Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus VOLUTILITHES.

Volutilithes dalli nov. sp. Pl. 6, fig. 8, a.

Caricella reticulata Heilp., non Ald., Proc. Ac. Nat. Sci. Phila., 1890, p. 396.

Specific characterization.—Size and general form as indicated by the figures; whorls about 7; spiral whorls and shoulder of the body whorl generally coarsely cancellated with revolving lines and transverse costæ; humeral angle of the body whorl often spinose; medial portion of the body whorl with finer but very distinct revolving striæ and fine lines of growth; base of body whorl as in other members of this genus; labrum strongly lirate within; columella with two well-defined oblique plaits and sometimes one or more rudimentary ones.

The amount of reticulation or ornamentation possessed by different

individuals of this species varies greatly. Some specimens are quite smooth on the medial portion of the body whorl, and show but slight irregularities on the shoulder. A form of this character is shown in fig. 8a. Such specimens have usually two well-marked folds on the columella and no trace of additional ones.

This species is evidently related to *V. haleanus* Whitfd., but is less strongly sculptured, and wants the peculiar concave humeral zone of that species. Moreover, *haleanus* has three distinct and well-defined columellar plaits.

This species is named in honor of W. H. Dall, the well-known authority on *Volutidae*.

Localities.—Smithville; Cedar Creek, Robertson Co., Tex.

Horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CARICELLA.

Caricella demissa Con., var. *texana* Gabb. Pl. 6, fig. 9.

Cimbiola texana Gabb, Jour. Ac. Nat. Sci. Phila., vol. 4, p. 382, pl. 67, fig. 33.
Caricella demissa Harris, Exp. Sta. Rept., pt. 1, Geol. and Agr., 1892. A Preliminary Report upon the Hills of La., by Otto Lerch, p. 29.

Gabb cites his *C. texana* from "Wheelock, Tex." His specimen was evidently small and badly preserved. Normally there are six whorls. The columella is considerably recurved, but this is a feature that could not be determined from a specimen lacking its anterior canal as did Gabb's type. The ornamentation of the spiral whorls consists of revolving lines, more distinct above, and more or less regular and apparent longitudinal plaits. Below the suture there is a slight constriction.

Localities.—Smithville, Bastrop Co.; Alabama Bluff, Trinity River, Houston Co.; Hurricane Bayou, Houston Co., Tex. Also near Mt. Lebanon, Bienville Parish, La.

Geological horizon of this variety.—Lower Claiborne Eocene.

Caricella subangulata Conrad, var. *cherokeensis* nov. var. Pl. 6, fig. 10.

Variety characteristics.—Size and general form as indicated in the figure; whorls 5; 1 mammillated; 2, 3, 4 spirally striate, suture distinct; body whorl shouldered, spirally striate above and also at the base of the whorl; columellar plaits four, the lower two more oblique.

Typical *subangulata* is larger, but with about one less whorl, and with lower and more obtuse spire.

Localities.—Mosley's Ferry, Brazos River, Burleson Co.; two miles west of Crockett, Houston Co.; Collier's Ferry, Burleson Co.; two miles east of Alto, Cherokee Co.; Collard's farm, Sparks' Head-right, Brazos Co., Texas.

Geological horizon of the variety.—Lower Claiborne Eocene.

Type of the variety.—Texas State Museum.

Genus TURRICULA.

Turricula (Conomitra) texana nov. sp. Pl. 6, fig. 11.

Specific characterization.—Size and form as indicated in the figure; whorls 5; nuclear whorl obtuse, smooth; other spiral whorls ornamented by longitudinal costæ, and a slight, subsutural depression; body whorl with much more numerous costæ, a slight subsutural depression, surface without a trace of spiral lines and polished; columella 4-plaited, the penultimate the largest; labrum crenulate within.

Localities.—Well at College Sta., Brazos Co.; Alabama Bluff, Trinity River, Houston Co.; Hurricane Bayou, near Crockett, Houston Co.; Collard's farm, Town Branch, Brazos Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus LEVIFUSUS.

Levifusus trabeatoides nov. sp. Pl. 6, fig. 12. a.

Fusus trabeatus Heilp. (not Con.), Proc. Ac. Nat. Sci. Phila., 1890, p. 395.

Specific characterization.—General form as figured; whorls 8 or 9; 1, 2, 3 smooth and polished, 4 sub-biangular, 5, 6 with one spiral line just below the suture and two or three more near the base of each whorl where they are crossed by sharp, fine, costæ, 7 evenly striate spirally showing more or less distinct costæ and curving lines of growth; body whorl evenly striate, bicarinate, with faint indications of tubercles on each carina, lines of growth with a retral curve above the upper carina resembling those of *Surcula*; labrum strongly striate within.

Below the two prominent carinæ there is a third faint one. Large old specimens sometimes show on the body whorl one very strong carina above, while the two lower are rudimentary. Fragments have been obtained which would indicate a total length of an entire specimen of at least three inches.

The generic name *Levifusus*, as far as the writer is aware, has never been characterized; yet since Conrad has referred to it the

species formerly described as *Fusus trabeatus* and *Busycon? blakei*, its characters must be fairly familiar to every worker in Tertiary paleontology. They may be summed up as follows:—

Shell of Fulgurate aspect and affinities (not Fusoid as the name unfortunately indicates); with three carinæ on the body whorl, the uppermost strongest and generally spinose, the second less distinct and less frequently spinose, the third or lowest generally faint and obtuse and with no signs of tubercles or spines.

Besides the two species referred to this genus by Conrad, the writer has added two more, viz., *Levifusus branneri*, originally described from the White Bluff horizon of Arkansas, and *L. trabeatoides*.

At Wood's Bluff, Ala., there is a form of *Levifusus* with characters intermediate between *L. trabeatus* and *L. trabeatoides* and it is doubtless the ancestral type of both. This prototype may then be regarded as having produced the true *L. trabeatus* in Alabama, while in Texas the *L. trabeatoides* was developed. *L. blakei* is somewhat more tuberculate on its uppermost carina than *L. trabeatus* or *L. trabeatoides* but is not so strongly marked as *L. branneri*; the last-mentioned species the writer has recently found in typical Jackson Eocene deposits at Moody's Branch, Jackson, Miss.

Localities.—Rio Grande, 2 miles above San José, Tex.; Mosley's Ferry, Brazos River; Colorado River, bluff just below the mouth of Alum Creek; Rio Grande, 15 miles below Carrizo; Little Brazos River, near iron bridge on Mosley's Ferry road; Brazos River, 500 yards below the mouth of Little Brazos; Cedar Creek, southeast corner of Wheelock League, Robertson Co.; Smithville, Bastrop Co.; Alum Bluff, Trinity River, Houston Co.; Campbell Creek, Robertson Co.; 2 miles west of Crockett, Houston Co.; northwest corner of Madison Co.; Jones' farm, Hurricane Bayou, Houston Co.; Orrell's crossing, Elm Creek, Lee Co.; cutting on Houston, East & West Texas R., 4 miles north of Corrigan, Polk Co.; southeast corner of Frio Co.; southeast of Campbellton, south of Lipan Creek, Atascosa Co. Also at Gibbsland, Bienville Park, La., and Walnut Bluff, Ouachita River, Ark.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **LATIRUS**.

Latirus singleyi nov. sp. Pl. 6, fig. 13.

Specific characterization.—Size and general form as shown by the figure; whorls 9?; 4, 5, 6, 7, 8 marked by obtuse rounded ribs, which extend from suture to suture, by five strong, waving spiral lines on each whorl, and by fine, sharp, and even lines of growth most plainly visible between the costæ; body whorl with six obtuse costæ and about 24 raised spiral lines which, in the humeral region, consists of one strong series between which finer lines alternate, but below all become equal; lines of growth sharp and distinct, but fine; columella with two strong, oblique folds and a rudimentary one below; labium extending in a thin polished plate over the columella; umbilicus rudimentary.

Locality.—Elm Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Latirus singleyi var. Pl. 6, fig. 13a.

This is smaller than the typical form and more slender with less distinct lines of growth.

Locality.—Hurricane Bayou, near Crockett, Houston Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **STREPSIDURA**.

Strepsidura ficus Gabb. Pl. 7, fig. 1.

Whitneya ficus Gabb. Geol. Surv. Cala., Paleont., vol. 1, 1864, p. 104, pl. 28, fig. 216.

? *Bulbifusus inauratus* Heilp., Proc. Ac. Nat. Sci. Phila., 1890, p. 396.

The specimen figured is about one-half the size of the California types and is eroded at the summit. Other specimens, though upon the whole less perfect, show the surface markings much better than the figured specimen does.

Localities.—"Ft. Téton, Cal.," Gabb; Alum Creek Bluff, Colorado River, not far above Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **FUSUS**.

Fusus bastropensis nov. sp. Pl. 7, fig. 2.

Specific characterization.—Size and general form as indicated in the figure; whorls 13 or 14; 1 and 2 very minute, smooth, 3 and 4 transversely costate, 5–12 with nodose obtuse ribs, distinct in 5, 6,

etc., but less marked in 11 and 12, crossed by six or seven spiral raised lines, coarse or strong near the base of each whorl; one spiral line, generally the second from the base forms a slight carination on the whorls; body whorl with broad nodulations, about seven in number, and with strong spiral raised lines, the two on the largest part of the whorls being largest, above which there are two or three well-marked lines and below which to the end of the canal the lines gradually decrease in size and are more or less alternating; labrum, as far as observed, non-striate within; columella long, smooth, and straight.

This resembles somewhat *F. meyeri* Ald.

Localities.—Smithville, Bastrop Co., Tex. Also in Claiborne and Bienville Parishes, La.

Geological horizon.—Lower Claiborne Eocene.

Type.—Coll. of G. D. Harris.

Fusus ostrarupis nov. sp. Pl. 7, fig. 3.

Specific characterization.—General form as figured; whorls 8; 1 and 2 smooth and polished, 3 sometimes polished, with long, undulating costæ, 4, 5, 6, 7 evenly striate spirally, and with seven or eight longitudinal costæ; costæ decreasing in size about or just below the suture where a slightly depressed zone occurs; body whorl with eight or ten costæ somewhat variable in size, subsutural zone much compressed, spiral striæ moderately even but slightly strongest on the largest part of the whorl; labrum strongly striate within; columella recurving; umbilicus rudimentary.

Locality.—Smiley's Bluff, Brazos River, 2 miles above the mouth of Pond Creek, Milam Co., Tex. Oyster Bluff of Penrose's Report.

Geological horizon.—Midway Eocene.

Type.—Texas State Museum.

Fusus mortoni, var. *mortoniopsis* Gabb. Pl. 7, fig. 4.

Fusus mortoni Lea, var. *carexus* nov. var. Pl. 7, fig. 5.

Differs from *mortoniopsis* Gabb, which is doubtless a variety only of *mortoni* Lea, by having a strong carina, one additional spiral line on the shoulder and less strongly alternating on the canal. The shell is much broader in proportion to its height and has a lower spire.

Locality.—Between Orrell's and Evergreen Crossing, Elm Creek; Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CLAVILITHES.

Clavilithes regexus nov. sp. Pl. 7, fig. 6.

This species is too poorly represented in the collection of the Survey to admit of complete characterization specifically. It is comparable in size with *C. penrosei* Heilp., and resembles the latter in the lower part of the whorls and in the long, smooth columella. Above, however, it shows no traces of a shoulder, the whorls are slightly flattened laterally, and are smooth and polished.

Localities.—Near McBee School-house, Cherokee Co.; between Orrell's and Evergreen Crossing, Elm Creek, Lee Co.; 2 miles west of Crockett, Houston Co.; Berryman Place, Kimble Headright, Cherokee Co.; 3 miles north of Crockett, Houston Co.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Collection.

Clavilithes humerosus Conrad, var. *texanus* nov. var. Pl. 7, fig. 7.

Differs from typical *humerosus* in having the sides of the body whorl nearly rectilinear, in having a more prominent shoulder at the suture, and in being of a smaller size generally. Many specimens approach closely *Clavilithes longævus* of the middle Eocene of Europe.

Localities.—Near McBee school-house, Cherokee Co.; Alum Creek Bluff, Colorado River, Bastrop Co.; Wilson Reid Headright, Brazos Co.; Hurricane Bayou, Hodge's Headright, Houston Co.; northwest corner of Madison County; Collier's Ferry, Burleson Co.; Collard farm, Sparks' Headright, Brazos Co., Tex. Also in Claiborne and Bienville Parishes, La., and 2½ miles east of Newton, near Enterprise, Miss.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Clavilithes kennedyanus nov. sp. Pl. 7, fig. 8.

Specific characterization.—General form as figured; whorls 10 or 12; 1 and 2 probably smooth; 3–10 with nodular ribs most prominent on the lower portions of the whorls, crossed by raised spiral lines and by even lines of growth; body whorl in the type specimen very poorly preserved, but showing few signs of costæ; columella ponderous.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Clavilithes (Papillina) dumosus Con., var. *trapaquarus* nov. var. Pl. 8, fig. 1.
Fusus (Papillina) dumosus Harris, La. Exp. Sta., 1892. Rept. on the Hills of
 La., p. 29.

This is a heavier, more solid form than the typical *dumosus*; it has about two more spines on the body whorl and has a smaller apex.

Localities.—Brazos River, 1 mile below Milam-Burleson County line; near McBee School-house, Cherokee Co.; Alum Bluff, Trinity River, Houston Co.; 5 miles west of Crockett, Houston Co.; Hurricane Bayou, Marsters' Survey, near Crockett, Collier's Ferry, Brazos River, Burleson Co.; north of College, Crockett, Houston Co.; Dr. Collard's farm, Sparks Headright, Brazos Co. In Louisiana, near Mt. Lebanon, Bienville Parish.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CHRYSODOMUS.

Chrysodomus parbrazana nov. sp. Pl. 7, fig. 9.

Specific characterization.—General size and form as indicated by the figure; whorls 6; spiral whorls smooth, with a faint subsutural spiral line; body whorl ornamented with the subsutural line and about ten basal spiral lines; outer lip sharp edged, lirate within.

Locality.—Little Brazos River, near iron bridge, on Mosley's Ferry road.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus ASTYRIS.

Astyris bastropensis nov. sp. Pl. 8, fig. 2.

Specific characterization.—General form and size as indicated by the figure; whorls 10; 1, 2, 3 smooth and polished; 4 costate; 5-9 smooth and polished, sometimes one spiral line at base of 8 and 9; body whorl smooth above the upper terminus of the aperture, strongly striate below.

The general outline of the shell is strikingly like that of *Turricula polita*.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus MUREX.

Murex fusates nov. sp. Pl. 8, fig. 5.

Specific characterization.—Size and general form as indicated by the figure; whorls 8; 1, 2, 3, 4 smooth and polished, very small;

5, 6, 7 with about three coarse revolving raised lines, with obtuse regular longitudinal costæ; body whorl with regular strong raised lines on its larger portion and finer ones below, also with seven obtuse costæ over which the spiral lines pass; labrum with five or six crenulations within; a basal *Nassa*-like fold on the columella.

In a general way this species resembles *M. vanuxemi* Con., but the costæ are very different and show no signs of forming acute angles, folds or spines.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Subgenus ODONTOPOLYS.

M. (*Odontopolys*) compsorhytis Gabb. Pl. 8, fig. 6.

*M. (*Odont.*) compsorhytis* Gabb, Jour. Ac. Nat. Sci. Phila., vol. 4, 1860, p. 377, pl. 67, fig. 16.

Murex sp.? Harris, La. Exp. Sta., Rept. on Hills of La., pt. 1, 1892, p. 29.

According to Gabb the type of this species came from Wheelock, Tex., and was deposited in the collections of the Smithsonian Institution. Unfortunately it has been lost. The State Survey's collection has yielded no specimens of this species, but in the U. S. National Museum there is a specimen collected by T. Wayland Vaughan, from Hammett's branch, 2 miles east of Mt. Lebanon, Bienville Parish, La. This is herewith figured.

Gabb's figure of this species is very poor, while his description is good. His figure has been copied in Tryon's Structural and Systematic Conchology, vol. 2, 1883, pl. 43, fig. 4, and this in turn is copied in De Gregorio's Monograph Faun. Eoc. Ala., pl. 6, fig. 47.

Meyer's *Odontopolys triplicata*, Sonder-Abdruck aus "Bericht über die Senkenbergische Gesellschaft in Frankfurt a. M.," 1887, p. 7, pl. 1, fig. 6, is a *Volute*, perhaps the young of *V. petrosus*.

Genus PSEUDOLIVA.

Pseudoliva ostrarupis nov. sp. Pl. 8, fig. 3, a.

Specific characterization.—Size and general form as figured; volutions 6, spiral whorls shouldered and somewhat costate; suture obscured by foliæ developed by the intermittent mode of growth of the sutural callosity; body whorl below scarcely distinguishable from the non-umbilicate varieties of *Ps. vetusta*, while above, the shoulder and the sutural foliæ at once definitely characterize the species.

Locality.—Smiley's Bluff, Brazos River, 2 miles above the mouth of Pond Creek, Milam Co., Tex.

Geological horizon.—Midway Eocene.

Type.—Texas State Museum.

Pseudoliva ostrarupis, var. *pauper* nov. var. Pl. 8, fig. 4.

Genus TENUISCALA.

Tenuiscala trapaquara nov. sp. Pl. 8, fig. 7.

Specific characterization.—Size and general form as shown by the figure; whorls 12 or more; nuclear 4 smooth and polished; 5–11 traversed by fine sharp longitudinal costæ and numerous spiral lines, the latter consisting of five coarse lines occupying the medial and basal portions of the whorl and as many microscopic lines on a subsutural zone; body whorl generally but imperfectly preserved, sculpturing as in the whorls immediately above, the base, however, being exposed, shows from 12 to 15 strong spiral lines.

Localities.—Mosley's Ferry, Brazos River, Burleson Co.; Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

T. trapaquara, var. *engona* nov. var.

Slightly shorter, more angulated, and with a broad subsutural band without strong revolving striæ.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus PYRAMIDELLA.

Pyramidella bastropensis nov. sp. Pl. 8, fig. 9.

Specific characterization.—Size and general form as shown by the figure; whorls 13 or 14, polished; suture channelled; one sharp strong fold on the columella.

This species resembles to some extent *E. perexilis* Con., but differs from it by being broader at base and more rapidly tapering in the lower four or five whorls.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **SYRNOLA**.

Syrnola trapaquara nov. sp. Pl. 8, fig. 10.

Specific characterization.—Size and general form as indicated by the figure; whorls 7; 1 small, sinistral; 2–7 polished, slightly tumid, with a well-marked suture; aperture moderate, striate within; one strong plait on the columella.

Localities.—Smithville, Bastrop Co.; Jones' farm, Hurricane Bayou, Houston Co., and in Mr. Singley's collection from Mosley's Ferry.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **PYRULA**.

P. (Fusoficula) texana nov. sp. Pl. 8, fig. 11.

Odontopolys texana Aldr. Labelled specimens from Aldrich, now in the U. S. Nat. Mus.

Volutilithes? recta Aldr., MS. plates, pl. 2, figs. 12, 12a.

Specific characterization.—General form as indicated by the figure; whorls (in a mature specimen) at least 6; apex obtuse; whorls 1, 2 smooth; 3 spirally striate in part, and in part striate and costate; 4 and 5 with spiral raised lines alternating in size, and with longitudinal folds or costæ, the latter occasionally becoming varicose; body whorl marked by four spiral lines on the humeral region, below by three series of spiral lines, and by about twenty rather irregular longitudinal costæ; outer margin of the labrum sharp, within thickened and with rather irregular crenules; columella generally smooth; but sometimes with two irregular swellings just below the point of greatest curvature.

This is a very strange form. The apex is very obtuse and the nuclear whorls as a whole are generally deflected somewhat from the axis of the adult shell. So far the species is a true *Pyrula*. Moreover the striation is that of *Pyrula*, but the costation is more irregular than in any of the known species of that genus; in fact it varies from moderately fine *Pyrula*-like lines to strong varices. The swellings on the columella, though in no wise true plaits, are worthy of note. They are evidently of the same origin and nature as those in *Mazzalina*.

Localities.—Mosley's Ferry, Brazos River, Burleson Co., Little Brazos River, near iron bridge; Cedar Creek, Lee Co.; Dunn's

Ranch, Robertson Co. This species is also found in various places in Bienville Parish, La., and in Mississippi $2\frac{1}{2}$ miles east of Newton.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **CYPRÆA**.

Cypræa kennedyi nov. sp. Pl. 8, fig. 12, a.

Specific characterization.—General form and size as indicated by the figures; oral or front surface strongly ribbed transversely, ribs tending to divaricate; mouth moderately wide above, broad submedially and contracted below with one plait-like fold on either side; back smooth except near the margins where there are strong radiating lines.

Locality.—Dr. Collard's farm, Town Branch, Sparks Headright, Brazos Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus **RIMELLA**.

Rimella texana nov. sp. Pl. 9, fig. 1.

Specific characterization.—Size and general form as indicated by the figure; whorls 11; 1 exceedingly small, smooth; 2, 3, 4, 5 smooth and polished; 6, 7 faintly and finely cancellated; 8 with small longitudinal plicæ crossed by minute spiral striæ; 9, 10 more strongly plicate longitudinally, plicæ most strongly developed midway of the whorls; body whorl plicate superiorly though not immediately below the suture; spiral striæ very fine over the plicæ but coarse above and very coarse below; outer lip acute below, thick and reflected above, medially forming a right angle; inner lip well defined, uniting with the outer above and forming a canal that passes up the spire rather more than half-way to the apex, recurving descends the width of a whorl or two; columella long and pointed, deflected backward.

Localities.—Colorado River, Devil's Eye, Bastrop Co.; Brazos River, about one mile below the Milam-Burleson County line; Mosley's Ferry (Singley's collection); Collier's Ferry, Burleson Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Rimella texana, var. *plana* nov. var. Pl. 9, fig. 2.

In this form, which is probably only a variety of the foregoing,

the posterior canal extends nearly or quite to the apex of the spire, and recurving descends to near the body whorl. The only ornamentation is the spiral striation at the base of the body whorl, and sometimes faint costæ near the apex.

Localities.—Two miles east of Alto, Cherokee Co.; near McBee School-house, Cherokee Co.; Collier's Ferry, Brazos River; 2 miles west of Alto, Cherokee Co.; Sulphur Springs, Rusk Co.; Robbins' well, Houston Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus CERITHIUM.

Cerithium webbi nov. sp. Pl. 9, fig. 3.

Specific characterization.—General form of young specimens as shown in the figure; whorls about 9; spiral ones marked by two submedial approximate spiral rows of crenules or nodes above which, and just below the suture, is a third row with smaller crenulations; suture deep and broad; body whorl marked somewhat as those above though the lower submedial row of crenules is faint, and below it to the end of the beak occur spiral raised lines of varying strength; the entire surface is apparently covered with minute revolving lines; lines of growth on the body whorl start at right angles to the suture above, pass downward to the middle of the whorl, curve gradually forward and, after reaching the base of the whorl, slowly again curve backward and pass downward on the canal.

Locality.—Rio Grande, 13 miles by river below Laredo, or 9 by river above the Webb-Zapata County line, Texas side.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Cerithium penrosei nov. sp. Pl. 9, fig. 4.

Specific characterization.—Whorls at least 15, gradually tapering, ornamented as follows: by (1) about seven laterally compressed, oblique subcentral or basal nodes, or costæ on each whorl, those on the smaller whorls of the spire not so distinctly defined as represented by the figure; by (2) spiral lines or striae, about five of which are strong and occupy the lower one-third of each whorl, three or four more are finer and occupy a narrow, irregular central zone, while four or five more occupy the upper or non-costate portion of the whorls.

The costæ on the several whorls are arranged in lines corresponding in direction to the obliquity of the costæ.

Unfortunately only fragments of this large *Cerithium* have been found; it doubtless measured eight or ten inches in length when entire.

Locality.—Smiley's Bluff, Brazos River, 2 miles above the mouth of Pond Creek, Milam Co., Tex.

Geological horizon.—Midway Eocene.

Type.—Texas State Museum.

Genus MESALIA.

Mesalia claibornensis Con. (MS). Pl. 9, fig. 5.

Specific characterizations.—Size and general form as indicated by the figure; whorls about 15; sides of the whorls nearly rectilinear; sides of the spire taken as a whole slightly concave; surface of each whorl ornamented by spiral lines of three sizes, of which there are from five to seven of the first and second, and double that number of the third magnitude, the latter are mere striæ; lines of growth faint or obscure; suture well defined but very narrow.

This species is similar in some respects to Conrad's *Mesalia vetusta*, but can at once be distinguished by the following differences: *claibornensis* has two or three more whorls; the sides of the spires are concave and not convex as in that of *vetusta*; the suture is less distinctly marked by a shoulder below it; there is a total lack of those strong lines or folds of growth so characteristic of *vetusta*; the lower angulation of the body whorl is more sharply defined.

Localities.—Colorado River, Devil's Eye, Bastrop Co.; Mosley's Ferry, Brazos River; Wheelock, Robertson Co.; Little Brazos River; Cedar Creek, Wheelock League, Walker's and Montgomery's farm, Robertson Co.; College Sta., Brazos Co. (from a well 1,200 feet deep); Elm Creek, near Benchley's; Wm. Reid Headright, Brazos Co.; Elm Creek, Lee Co.; Berryman's Place, Cherokee Co.; Alabama Bluff, Trinity River, Houston Co.; 5 miles west of Crockett, and Hurricane Bayou, Houston Co.; northwest corner of Madison Co.; 3 miles northeast of Crockett, on Rusk road; along Elm Creek, from Orrell's to Price's crossing; Lewis' house, 2 miles east of Alto, Cherokee Co.; Dr. Collard's farm, Town Branch, Sparks Headright, Brazos Co.; Dunn's Ranch, Gafford Headright, Robertson Co.; Walker's pasture, Wheelock Prairie, Robertson Co.; Bonita

Creek, Pleasanton, Atascosa Co., Tex. Also 5 miles southeast of Gibbsland, and 2 miles southeast of Mt. Lebanon, Bienville Parish, La.; 4 miles west of Enterprise, Miss.; base of bluff at Claiborne, Ala.

Specimens from the last-mentioned locality are somewhat less broad at base, more strongly striated spirally, and with slightly more rounded volutions than the typical Texan form. In the collection of the Academy of Natural Sciences of Philadelphia these Lower Claiborne forms are labelled by Conrad "*Mesalia claibornensis*." I am not aware that the species has ever before been figured or described. It is one of the most abundant and characteristic of the Texan Eocene.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus TURRITELLA.

Turritella nasuta Gabb, var. *houstonia* nov. var. Pl. 9, fig. 6.

This variety differs from typical *nasuta* in being much broader at base, and having its whorls rounded or slightly carinated submedially. It is generally somewhat larger than the typical form, and is closely related to Conrad's *Mesalia lintea*.

Localities.—Rio Grande, at Webb-Zapata County line; Elm Creek, near Benchley; Alum Bluff Trinity River, Houston Co.; Dunn Ranch, Robertson Co. Also in South Carolina, near Orangeburg C. H.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Turritella dumblei nov. sp. Pl. 9, fig. 7.

Specific characterization.—Size and general form as shown by the figure: whorls about 15: the lower two to four show an obtuse basal carination while above, this feature is not so apparent; surface marked by raised spiral lines alternating in size, the carinal zones of the lower whorls are marked by two somewhat stronger lines; lines of growth plainly cutting the spiral lines and causing them to appear under a glass like diminutive strings of beads.

This species reminds one somewhat of *T. alabamiensis* Whitf., but is most probably nearest allied to *T. infragranulata* Gabb (Geol. Surv. Cal., Pal., vol. 1, 1864, p. 212, pl. 32, fig. 279), from near Martinez, Cal. Wherever the lines of growth are strong over the basal carina they tend to produce an "*infragranulata*" appearance.

Localities.—Mosley's Ferry, Brazos River, Burleson Co.; Cedar Creek, Wheelock League; well at College Sta., Brazos Co.; Campbell Creek, Robertson Co.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Turritella dutexata nov. sp. Pl. 9, fig. 8.

Specific characterization.—Whorls (in a complete specimen) about 15; all marked by two subcentral carinal lines together with one small one just below and one just above the suture.

Besides the ornamentation shown on the specimen figured, there are usually about four spiral striæ on each whorl between the upper carinal and subsutural line; between the two strong carinal lines there is often a faint stria; likewise one often appears just below the lower carina. When fully striated this species bears a general resemblance to *T. arenicola* and *T. arenicola* var. *branneri*, but may be distinguished at once by the persistency of the bicarinate feature of the whorls to the very apex. The apical whorls of *T. arenicola* and variety are unicarinate somewhat as in *T. carinata* H. C. Lea (*T. apita* De Greg.). It will be observed that in Meyer's carefully drawn figure of *T. carinata* H. C. Lea, in the Proc. Ac. Nat. Sci. Phila., 1887, p. 54, pl. 3, fig. 1, 1a, two carinæ are represented on each whorl, but it is the upper one which predominates on the apical whorls; in *dutexata* it is the lower.

Localities.—Elm Creek, Lee Co.; Taylor's well, 5 miles southeast of Franklin, Robertson Co. (specimens in the U. S. Nat. Mus.); 7 miles southeast of Jewett, Leon Co., (specimens in Aldrich's coll.); also in a small varietal form at Orrell's Crossing, Elm Creek, Lee Co.; near Baptizing Creek, Cherokee Co., Tex. Also in Louisiana at southwest $\frac{1}{4}$, southeast $\frac{1}{4}$ Sect. 19, R. 7 W. Tp. 19; Holstein's well, 5 miles south of Gibbsland, Bienville Parish; mouth of Saline Bayou, Red River; Sect. 29, Tp. 17, R. 5 W. In Mississippi $2\frac{1}{2}$ miles east of Newton; Wautubbee hill, near Enterprise. In Alabama at Claiborne.

Geological horizon.—Lower and Upper Claiborne Eocene.

Type.—Singley's collection.

Turritella nerinexa nov. sp. Pl. 9, fig. 9.

Specific characterization.—Size and general form of a fragment

(the only known specimen) as indicated by the figure; number of whorls unknown, ornamented by (1) fine even spiral striæ, (2) a subsutural row of pustules or crenules, and (3) a slightly raised or faint ridge at the base of each whorl becoming obsolete in the lower whorls, but increasing in strength above so as to nearly equal in size the subsutural line of crenules.

Locality.—Black Bluff, Brazos River, extreme northern limit of Milam Co., Milam Bluff of Penrose's Report.

Geological horizon.—Midway Eocene.

Type.—Texas State Museum.

Genus SOLARIUM.

Solarium huppertzi nov. sp. Pl. 9, fig. 10, a.

Specific characterization.—Size and general form of young specimens (no adults have thus far been found) as shown by the figure; whorls 3; mouth roughly hexagonal, bounded by the following lines: (1) the upper margin of the whorl, extending from a bicrenulate suture to a peripheral row of crenulations; (2) the exterior lateral margin of the whorl, extending from the row of crenulations just mentioned to a second or medial row; (3) the exterior sublateral margin of the whorl, extending from the medial row of crenulations to the basal row; (4) the basal margin of the whorl, extending from the basal row of crenulations to an interior sublateral row; (5) the umbilical margin; (6) the margin of contact with the penultimate whorl.

This shell is flat or discoid like the young of most members of this genus.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Solarium bastropensis nov. sp. Pl. 9, fig. 11, a.

Specific characterization.—Size and general form as indicated by the figure; whorls $4\frac{1}{2}$; spire very low, marked only by the suture and a fine line just above it; body whorl depressed, somewhat carinate, marked on the periphery by three raised lines, and near the umbilicus by radiating lines of growth.

Locality.—Smithville, Bastrop Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum.

Genus AMAUROPSIS.

Amauropsis singleyi nov. sp. Pl. 9, fig. 12.

Specific characterization.—General form and size as indicated by the figure; spire pointed and high; whorls 7; body and penultimate whorls shouldered above as in *N. recurva*; umbilicus small, partially hidden by the labium; margin of the aperture sharp, reflected.

This species might be mistaken for the young of *recurva* were it not for the fact that the two have differently formed umbilici. In *recurva* there is a ridge formed by the continuation of the lower margin of the aperture that, after passing below and to the left of the umbilicus, winds up into the same as described by Aldrich. In *singleyi* the lower margin of the aperture stands out sharply. If traced upward and inward it will be found to follow the labium about one-third way across the umbilicus and then to wind up into the same.

Locality.—Cedar Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Collection of J. A. Singley.

Genus DILLWYNELLA.

Dillwynella? texana nov. sp. Pl. 9, fig. 13.

Specific characterization.—Size and general form as indicated by the figure; whorls 4; spiral, smooth, and shining; body whorl nearly smooth but showing a slight tendency to bear furrows or lines radiating from the suture; umbilicus small; mouth round.

The umbilical portion of this shell appears to be more or less whitened or enameled.

Locality.—Jones' farm, Hurricane Bayou, Houston Co.; from Lee County and Mosley's Ferry, Brazos River, (Aldrich's collection).

Geological horizon.—Lower Claiborne Eocene.

Type.—Texas State Museum. Unfortunately broken since figuring.

Genus GAZA.

Gaza? aldrichiana nov. sp. Pl. 9, fig. 14.

Specific characterization.—Size and general form as indicated by the figure; whorls 4; 1 minute, non-protruding; 2, 3 rather small and tumid, marked by a few radiating lines which extend from the suture downward about two-thirds across the whorls, reminding one

somewhat of the upper surface of *Solarium bellastriatum*; body whorl rather large, rounded, slightly flattened above, with indistinct radial lines or lines of growth, flattened slightly below, rugose near the umbilicus; umbilicus small, Solarium-like, rendered somewhat hexagonal by the protruding peripheral denticles; mouth round; shell rather thick; general appearance like *Dillwynella naticoides*.

Locality.—Elm Creek, Lee Co., Tex.

Geological horizon.—Lower Claiborne Eocene.

Type.—Aldrich's collection.

EXPLANATION OF PLATES.

PLATE 1.

- Fig. 1. *Modiola houstonia* nov. sp.
 Fig. 2. *Modiola texana* Gabb.
 Fig. 3. *Leda bastropensis* nov. sp.
 Fig. 4. *Leda milamensis* nov. sp.
 Fig. 5. *Leda houstonia* nov. sp.
 Fig. 6. *Adrana aldrichiana* nov. sp.
 Fig. 7. *Venericardia trapaquara* nov. sp.
 Fig. 8a *Astarte smithwillensis* nov. sp. (Typical).
 Fig. 9a, b, c. The same, small variety.
 Fig. 10. *Crassatella antestriata* Gabb.
 Fig. 10a The same, viewed from within.

PLATE 2.

- Fig. 1. *Crassatella texana* Heilp.
 Fig. 2. *Crassatella texalta* nov. sp.
 Fig. 3. *Crassatella trapaquara* nov. sp.
 Fig. 3a The same, viewed from within.
 Fig. 4. *Sphaerella anteproducta* nov. sp.
 Fig. 5. *Meretrix texacola* nov. sp.
 Fig. 5a The same, viewed anteriorly.
 Fig. 5b Smaller variety of the same species.

PLATE 3.

- Fig. 1. *Tellina tallicheti* nov. sp.
 Fig. 2. *Siliqua simondsi* nov. sp.
 Fig. 3. *Ceronia singleyi* nov. sp.

- Fig. 3a Smaller individual of the same species.
 Fig. 4. *Periploma collardi* nov. sp.
 Fig. 5. *Corbula aldrichi*, var. *smithvillensis* nov. var.
 Fig. 5a The same, lesser value.
 Fig. 6. *Martesia texana* nov. sp.
 Fig. 7. *Ringicula trapaquara* nov. sp.
 Fig. 8. *Volvula?* *smithvillensis* nov. sp.
 Fig. 9. *Cylichnella atysopsis* nov. sp.
 Fig. 9a The specimen labelled "*Volvula minutissima*" in the collection of the Academy.
 Fig. 10. *Terebra texagyra* nov. sp.
 Fig. 11. *Terebra houstonia* nov. sp.

PLATE 4.

- Fig. 1. *Terebra houstonia* var.
 Fig. 2. *Conus smithvillensis* nov. sp.
 Fig. 3. *Pleurotoma enstricrina* nov. sp.
 Fig. 4. *Pl.* (*Pleurotomella*) *anacona* nov. sp.
 Fig. 5. *Pl.* (*Sarcula*) *gabbi* Conrad.
 Fig. 6. *Pl.* (*Sarcula*) *moorei* Gabb.
 Fig. 6a A somewhat larger, more carinated specimen.
 Fig. 6b A strongly denticulate specimen.
 Fig. 7. *Pleurotoma beadata* nov. sp.
 Fig. 8. *Pleurotoma vaughani* nov. sp.
 Fig. 9. *Pleurotoma huppertzi* nov. sp.
 Fig. 10. *Pl. huppertzi*, var. *penrosei* nov. var.

PLATE 5.

- Fig. 1. *Pleurotoma leoncola* nov. sp.
 Fig. 2. *Pl.* (*Drillia*) *dumblei* nov. sp.
 Fig. 3. *Pl.* (*Drillia*) *dipta* nov. sp.
 Fig. 4. *Pl.* (*Drillia*) *nodocarinata* Gabb.
 Fig. 5. *Pl.* (*Drillia*) *prosseri* nov. sp.
 Fig. 6. *Pl.* (*Drillia*) *kellogi* Gabb.
 Fig. 7. *Pl.* (*Drillia*) *texaona* nom. mut.
 Fig. 8. *Pl.* (*Drillia*) *texanopsis* nov. sp.
 Fig. 9. *Pleurotoma insignifica* Heilp.
 Fig. 10. *Pl.* (*Mangilia*) *infans* Mr.

- Fig. 11. *Pl. (Borsonia) plenta* nov. sp. by Ald. & Har.
 Fig. 11a Apex of a very young and perfect specimen.
 Fig. 12. *Pl. (Eucheilodon) reticulatoides* nov. sp.
 Fig. 13. *Pl. (Taranis) finexa* nov. sp.
 Fig. 14. *Pl. (Clathurella?) fauna* nov. sp.
 Fig. 15. *Pl. (Bela) rebecca* nov. sp.

PLATE 6.

- Fig. 1. *Cancellaria paunones* nov. sp.
 Fig. 2. *Can. paunones*, var. *smithvillensis* nov. var.
 Fig. 3. *Can. paunones*, var. *junipera* nov. var.
 Fig. 4. *Cancellaria penrosei* nov. sp.
 Fig. 5. *Cancellaria bastropensis* nov. sp.
 Fig. 6. *Cancellaria ulmula* nov. sp.
 Fig. 7. *Volvaria gabbiana* Ald. MS.
 Fig. 8. *Volutilithes dalli* nov. sp.
 Fig. 8a A smoother variety.
 Fig. 9. *Caricella demissa*, var. *texana* Gabb.
 Fig. 10. *Caricella subangulata*, var. *cherokeensis* nov. var.
 Fig. 11. *Turricula texana* nov. sp.
 Fig. 12. *Levifusus trabeatoides* nov. sp.
 Fig. 12a Apex of the same magnified.
 Fig. 13. *Latirus singleyi* nov. sp.
 Fig. 13a Small variety of the same.

PLATE 7.

- Fig. 1. *Strepsidura ficus* Gabb.
 Fig. 2. *Fusus bastropensis* nov. sp.
 Fig. 3. *Fusus ostrarupis* nov. sp.
 Fig. 4. *Fusus mortoni*, var. *mortoniopsis* Gabb.
 Fig. 5. *Fusus mortoni*, var. *carexus* nov. var.
 Fig. 6. *Clavilithes regexus* nov. sp.
 Fig. 7. *Clavilithes lumerosus*, var. *texanus* nov. var.
 Fig. 8. *Clavilithes kennedyanus* nov. sp.
 Fig. 9. *Chrysodomus parbrazana* nov. sp.

PLATE 8.

- Fig. 1. *Clavilithes (Papillina) dumosus*, var. *trapaquarus* nov. var.
 Fig. 2. *Astyris bastropensis* nov. sp.
 Fig. 3. *Pseudoliva ostrarupis* nov. sp.
 Fig. 3a The same, front view.
 Fig. 4. *Ps. ostrarupis*, var. *pauper* nov. var.
 Fig. 5. *Murex fusates* nov. sp.
 Fig. 6. *M. (Odontopolys) compsorhytis* Gabb.
 Fig. 7. *Tenuiscula trapaquara* nov. sp.
 Fig. 8. *T. trapaquara*, var. *engona* nov. var.
 Fig. 9. *Pyramidella bastropensis* nov. sp.
 Fig. 10. *Syrnola trapaquara* nov. sp.
 Fig. 11. *Pyrula (Fusoficula) texana* nov. sp.
 Fig. 12. *Cypraea kennedyi* nov. sp.

PLATE 9.

- Fig. 1. *Rimella texana* nov. sp.
 Fig. 2. *R. texana*, var. *plana* nov. var.
 Fig. 3. *Cerithium webbi* nov. sp.
 Fig. 4. *Cerithium penrosei* nov. sp.
 Fig. 5. *Mesalia claibornensis* Con.
 Fig. 6. *Turritella nasuta*, var. *houstonia* nov. var.
 Fig. 6a *T. nasuta*, typical.
 Fig. 7. *Turritella dumblei* nov. sp.
 Fig. 8. *Turritella dutexata* nov. sp.
 Fig. 9. *Turritella nerinexa* nov. sp.
 Fig. 10. *Solarium huppertzi* nov. sp.
 Fig. 10a The same, from beneath.
 Fig. 11. *Solarium bastropensis* nov. sp.
 Fig. 11a The same, from above.
 Fig. 12. *Amauropsis singleyi* nov. sp.
 Fig. 13. *Dillwynella? texana* nov. sp.
 Fig. 14. *Gaza? aldrichiana* nov. sp.